

REMARKS/ARGUMENTS

Applicants request at the Examiner enter the amendments and reconsider the application in view of the following remarks.

The Amendments

The amendments clarify that the resin of the invention is not infinitely dilutable with water. The amendments are fully supported at paragraph 27 of the application. Applicants respectfully submit that the amendments add no new matter to the application, and earnestly solicit entry thereof.

The Office Action

Claims 1-18, all pending claims, stand rejected under 35 U.S.C. § 103(a) as unpatentable over Walisser, US 5,492,440. Applicants respectfully traverse this rejection. The claimed invention does not overlap ranges with all of the reaction conditions disclosed in Walisser, and does not overlap ranges with all of the product characteristics and properties of the Walisser product. Walisser does not suggest the claimed invention. Further, operating conditions and product characteristics and properties exemplified in Walisser do not fall within the scope of the claimed invention. For these and other reasons, Applicants respectfully submit that the claims are in condition for allowance.

The Invention

The invention is directed to a resin comprising the reaction product of the reaction product of phenol and formaldehyde and a formaldehyde scavenger. The former is the reaction product of phenol and formaldehyde introduced in a molar ratio of formaldehyde to phenol of between about 1.20 and 2.0 reacted at a temperature of between about 70 and

about 90°C. The reaction is carried out in the presence of between about 0.01 and about 0.1 moles of alkaline catalyst per mole of phenol to form a resin precursor having a free formaldehyde concentration of less than about 0.5 wt. percent. Formaldehyde scavenger is introduced in quantity sufficient at a temperature between about 70 and about 90°C for a time sufficient to produce a resin having a free formaldehyde concentration of less than about 0.15 wt. percent in the resin. The claimed resin is not infinitely dilutable with water.

The invention also relates to a method for producing the resin.

The Walisser Patent

The Walisser patent is directed to a resin for binding fibers, such as fiberglass, having good storage stability and high water tolerance (column 3, line 64, to column 4, line 2). The disclosure of the Walisser patent is directed to a melamine-modified phenol-formaldehyde resin that is infinitely dilutable with water. Walisser emphasizes the importance of water tolerance of the resin as early as column 2, line 67, of the patent. The water tolerance of Walisser's resin also is recited at least at column 3, line 4; column 4, line 50; column 6, lines 21-23; and column 7, lines 24-26.

The manner in which Walisser's resin is manufactured carefully controls the temperature of the reaction of melamine with a phenol formaldehyde resin to between 50 and about 70°C to ensure that the resin is not advanced so far as to destroy its water tolerance (column 6, lines 21-24 and 54-62).

Walisser's modified resin is made by adding melamine to the phenol formaldehyde resin having a free formaldehyde content of between about 0.5 and 2.5 wt.

percent (column 5, lines 10-14). The melamine addition is said to reduce the free formaldehyde to less than 0.7 wt percent.

Walisser's examples are telling. To ensure water tolerance, the resins of Examples 1, 4, 7, 8, and 9 are cooked at first at 50°C, then at 60°C, to react the phenol and formaldehyde, and the melamine is reacted at 60°C. Exemplified temperatures never exceed 60°C.

The phenol formaldehyde resins prepared in Example 1 had 0.9 wt. percent free formaldehyde; that of Example 8 had 1.1 wt. percent free formaldehyde; and those of Example 9 had free formaldehyde content of 1.0 and 0.75 wt. percent.

Walisser's melamine-modified resins for which free formaldehyde content is reported appear to be only those of Examples 1 and 4, which report 0.3 wt. percent. It is believed that the resultant free formaldehyde content is not reported for the other examples; only stability data is presented.

Remarks

Applicants respectfully submit that Walisser does not suggest the claimed invention. First, Walisser is an infinitely dilutable resin; the claimed resin is not. Thus, Walisser teaches away from the claimed invention. Indeed, Walisser described one of the failures of the then-known art as "low water tolerance." (column 1, lines 37-38)

Walisser's water tolerance is achieved by controlling reaction temperatures. The disclosed temperature range and the reaction temperature range claimed herein are mutually exclusive. The resin claimed herein would not be infinitely dilutable, as

described in the specification at paragraph 27. For clarity and emphasis, the claims have been amended to recite that the resin is not infinitely dilutable.

Further, other distinctions over Walisser emphasize the allowability of the pending claims. Walisser describes a free formaldehyde concentration in the resin before melamine addition as between 0.5 and about 2.5 wt. percent. The lowest exemplified level is 0.75 wt. percent; 0.9 – 1.1 wt. percent is typical. In contradistinction, the claimed invention is directed to resins having less than about 0.5 wt. percent free formaldehyde at this point in the reaction. Applicants respectfully submit that Walisser cannot be said to suggest the claimed invention, as there are no suggestions relating to free formaldehyde levels lower than the broadest range therein. There is no suggestion that one should endeavor to achieve a lower free formaldehyde content at this point in the reaction. Similarly, the lowest exemplified free formaldehyde in Walisser's melamine-modified resin is 0.3 wt. percent, double the maximum of the range in the claims herein.

When evaluating whether a reference suggests a claimed invention, one must consider the reference for all it teaches. Walisser discloses a melamine-modified phenol formaldehyde resin having good water tolerance, as reflected by 'infinite dilutability.' Phenol formaldehyde resin having a free formaldehyde content of about 0.5 to 2.5 wt. percent is prepared. Then melamine is reacted with the phenol formaldehyde resin at a temperature between 50 and about 70°C. The free formaldehyde level of the modified resin is lower than that of the unmodified resin, and the sole exemplification is at 0.3 wt. percent.

These disclosures of Walisser simply do not suggest that the operating conditions of the claimed invention would "provide adequate results." Indeed, the claimed invention

is wholly inadequate by Walisser's standards. Importantly, the claimed invention is directed to product having a significantly lower free formaldehyde level than that exemplified in Walisser, obtained by using different and mutually exclusive operating conditions from those in Walisser.

Walisser's disclosure of a broad range of temperature for the phenol formaldehyde reaction was identified as overlapping that claimed herein. Applicants respectfully submit that this is not relevant to the patentability of the claims herein, as it does not address the invention as a whole. The Office Action does not consider that the temperature range disclosed in Walisser for the melamine reaction teaches away from the temperature range set forth for the scavenger reaction in the claim.

Similarly, Walisser discloses that the phenol formaldehyde resin has between 0.5 and 2.5 wt. percent free formaldehyde. However, the claim recites that the phenol formaldehyde resin has less than about 0.5 wt. percent. Walisser does not suggest how the operating conditions claimed herein would provide such a level, and certainly does not suggest that one should attain this level. Further, despite the assertion in the Office Action, these ranges do not overlap.

For all these reasons, Applicants respectfully submit that the claims are in condition for allowance and earnestly solicit favorable action thereon.

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Amendment dated August 4, 2003
Reply to Office Action of March 4, 2003

Applicants petition for a two-month extension of the period for response, to and including August 4, 2003, and authorize the Commissioner to charge the requisite \$ 410 fee to our Deposit Account No. 19-0733.

Respectfully submitted,

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